

We claim:

1. A method of identifying an inhibitor of plant peptide deformylase activity, said method comprising:
 - (a) incubating a catalytically an effective amount of said peptide deformylase with a suitable substrate, and a candidate inhibitor compound, and
 - (b) detecting and quantifying the enzyme product formed.
2. The method according to claim 1 further comprising comparing the amount of enzyme product formed in the presence and absence of said candidate inhibitor.
3. The method according to claim 1 wherein said peptide deformylase is derived from *Arabidopsis thaliana*.
4. Herbicides which act by inhibiting plant peptide deformylase and which are identified by the method of claim 1.
5. A method of identifying herbicides which comprises testing a compound in a peptide deformylase inhibition assay such that a measurable

reduction of plant peptide deformylase is observed, and subjecting the compound to an *in vivo* test for herbicidal activity.

6. Herbicides identified by the method of claim 5.
7. A method of combating weeds comprising treating said weeds with a herbicide, wherein said herbicide is a compound which is an inhibitor of plant peptide deformylase.
8. The method according to claim 7 wherein said herbicide is actinonin.
9. A method of controlling vegetation comprising applying to plant foliage a herbicidally effective amount of an inhibitor of plant peptide deformylase.
10. The method according to claim 9 wherein the inhibitor is actinonin.

11. A method of inhibiting the activity of plant peptide deformylase comprising exposing said peptide deformylase to an effective amount of an inhibitor of said peptide deformylase.
12. The method according to 11 wherein the inhibitor is actinonin.
13. An antibody directed against peptide deformylase isolated from *Arabidopsis thaliana*.
14. A transgenic plant, wherein said transgenic plant is engineered to be resistant to an inhibitor of plant peptide deformylase.
15. A herbicidal composition comprising an inhibitor of plant peptide deformylase and a herbicidally acceptable surfactant.
16. The composition according to claim 15, wherein said inhibitor is actinonin.
17. The composition according to claim 16, wherein said herbicidally acceptable surfactant is Tween-20.

18. A method of controlling vegetation comprising applying to plant foliage a herbicidal composition, wherein said herbicidal composition comprises an inhibitor of plant peptide deformylase.

19. The method according to claim 18 wherein the said herbicidal composition comprises actinonin.

20. An isolated and purified polynucleotide sequence encoding an amino acid sequence of a plant peptide deformylase.

21. The polynucleotide sequence according to claim 20, wherein the plant peptide deformylase is derived from *Arabidopsis thaliana*.

22. An isolated amino acid sequence encoding a plant peptide deformylase polypeptide.

23. The amino acid sequence according to claim 22, wherein the plant peptide deformylase polypeptide is derived from *Arabidopsis thaliana*.

24. A recombinant vector comprising the polynucleotide sequence of claim 21.

25. A recombinant vector comprising the polynucleotide sequence of claim 20.

26. A host cell transformed with the recombinant vector of claim 24.

27. A host cell transformed with the recombinant vector of claim 25.

28. A host cell transfected with the recombinant vector of claim 24.

29. A host cell transfected with the recombinant vector of claim 25.

30. A method of producing a plant peptide deformylase polypeptide comprising:

(a) transforming a suitable host cell with a recombinant vector comprising a polynucleotide sequence encoding a plant peptide deformylase polypeptide, the gene being operably linked to suitable regulatory sequences; and

(b) growing the transformed cell under conditions where the peptide deformylase is expressed.

31. The method of claim 30 wherein the plant peptide deformylase polypeptide is derived from *Arabidopsis thaliana*.

32. A plant peptide deformylase polypeptide produced by the method of claim 31.

33. A plant peptide deformylase polypeptide produced by the method of claim 30.